JOB PROGRESS REPORT

RESEARCH PROJECT

| | | | |
|---|---|---|---|
| State | Montana | | |
| Project No. | W-120-R-10(5892) | Title | Statewide Wildlife Research |
| Program No. | III | Title | Nongame Animal Research |
| Study No. | NG-49.1 | Title | Nongame Animal Research |
| Job No. | 2 (Supplement) | Title | Habitat characteristics of bobcat, Canada lynx and river otter. |

Period Covered: July 1, 1978 - June 30, 1979

Prepared by: Howard S. Hash
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Approved by: John D. Cada
John P. Weigand

Date: January 15, 1980

ABSTRACT:

Montana maps that depict habitats and distribution of bobcat, Canada lynx and river otter are being developed. Harvest data from these species are being incorporated.

Biological specimens were obtained and analyzed from 256 bobcats, 5 lynx, 2 otter and 15 wolverines to determine sex and age structure, food habits, reproductive status and history, general condition, and disease and parasite loads.

A long-term, intensive bobcat ecology study is being initiated in Missoula and Granite counties to investigate the general ecology and biology of bobcat populations in a coniferous forest environment.

A river otter population status and distribution study in southwestern Montana is being implemented.

OBJECTIVE:

To conduct studies providing information on the habitat of bobcat, Canada lynx and river otter and transform these data into improved management guidelines for these species.

PROCEDURES:

Montana base maps and overlays are being used to designate general habitat and geographic distribution of the harvested and observed increments of the bobcat, Canada lynx and river otter populations.

Department personnel are being consulted to incorporate their knowledge regarding the location and general quality of bobcat habitat within their respective areas. The use of aerial reconnaissance, aerial photos and landsat imagery is being initiated to derive detail for the base maps. Harvest records are being related to various habitat types, human habitation and land use patterns.

Biological samples from bobcats, Canada lynx, river otter and wolverines were processed in the Department wildlife lab (Greer and Palmisciano, 1979) using the degree of foramen closure as criteria for differentiating the young of the year from the older age classes. Cementum annuli were designated by a commercial lab on the older specimens.

Stomach and/or colon contents were analyzed (Greer and Palmisciano, 1979) using known reference material to qualitatively and quantitatively designate food items and the presence of parasites and disease.

The general condition of carcasses was determined using a descending classification ranking system of 1-5 that considered body, omentum and kidney fat indices (Greer and Palmisciano, 1979).

Reproductive tracts were prepared for analysis to determine reproductive status and history (Greer and Palmisciano, 1979).

A long-term, intensive study of bobcat ecology is being initiated. This study of the general ecology and biology of bobcat populations in coniferous habitat types will utilize a variety of procedures.

Telemetry will be used to gather relocation data from sample animals of known age, sex and origin. Migrations, dispersal, range use, habitat selection, response to hunting and/or trapping pressure, response to variation in weather and other movements data will be compiled.

Habitat and range use will be delineated on maps and overlays of the area in reference to known cover types and habitat types that are present.

Food habits data will be compiled from the analysis of digestive tracts of harvested animals and the analysis of scats collected within the study area. These data will be related to prey species availability as determined by sample trapping within specific habitat types.

Data regarding long-term population structure and dynamics will be compiled utilizing reproductive tracts and jaws from harvested animals to designate sex, age classes, reproductive history and success. Kitten survival will be investigated using radio telemetry and direct observations.

Relationships of bobcats to prey and other predatory species will be investigated.

A series of M.S. stipend studies have been scheduled to accomplish approximately 60 percent of the field work.

A study of the population status and distribution of the river otter in southwestern Montana is being initiated.

Visual observation of otter and otter sign will be the primary technique employed to assess otter populations and to compare relative otter densities on the rivers of the upper Missouri group. Boat and foot travel and aerial reconnaissance are the primary techniques that will be used.

The physical characteristics of occupied otter habitat will be recorded. These data will be used to compare occupied areas with the existing spectrum of habitats to denote habitat selection or preference. Digestive tracts from harvested otter and scats will be collected and analyzed to determine food items. These data will be related to the existing food base within occupied habitats.

The possibility of inducing otter to use or visit artifically created latrine sites will be evaluated as an otter population trend assessment technique.

FINDINGS:

Montana base maps delineating general areas of bobcat habitat have been prepared. The geographic distribution of harvested and observed animals has been plotted for the past two seasons (Figure 1). The detail and accuracy is being upgraded as data are available.

The age classes of 244 bobcats, 22 percent of the 1978-79 harvest, are presented in Table 1 (Greer and Palmisciano, 1979). Young of the year and age classes 1-3 comprised 40 and 47 percent of the sample, respectively.

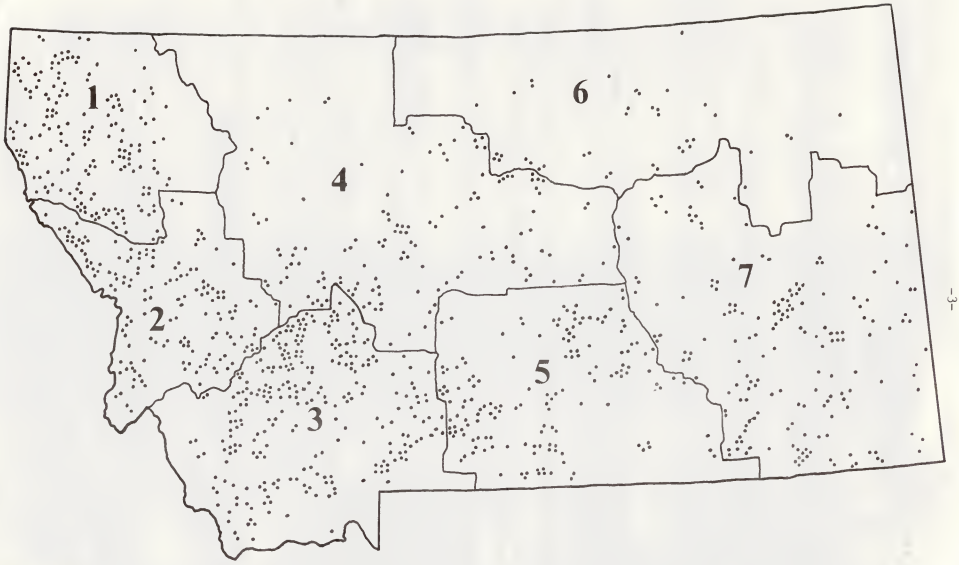


Figure 1. Geographic distribution of bobcats harvested, 1978-79.

Table 1. Bobcat age by cementum layers of upper canines from the 1978-79 harvest.

| REGION | ½ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 26 | 11 | 7 | 3 | 1 | 3 | 1 | 3 | 2 | 0 | 0 | 0 | 0 | 57 |
| 2 | 9 | 4 | 2 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 19 |
| 3 | 28 | 17 | 10 | 2 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 63 |
| 4 | 20 | 8 | 5 | 5 | 1 | 1 | 3 | 1 | 1 | 0 | 0 | 0 | 1 | 46 |
| 5 | 7 | 8 | 3 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 |
| 6 | 2 | 6 | 4 | 2 | 0 | 0 | 1 | 1 | [illegible] | 0 | 0 | 0 | 0 | 16 |
| 7 | 5 | 5 | 3 | 2 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 20 |
| State Total | 97 | 59 | 34 | 16 | 10 | 9 | 8 | 5 | 3 | 0 | 1 | 0 | 2 | 244 |
| % | 40 | 24 | 14 | 7 | 4 | 4 | 3 | 2 | 1 | 0 | - | 0 | 1 | - |

The sex ratio of the 1134 registered bobcats was 1.09/1.00 females to males.

Food habits data from 89 bobcats are presented in Table 2 (Greer and Palmisciano, 1979). Rabbits and hares, squirrels, deer and microtenes comprised 54, 24, 16 and 12 percent of the food items, respectively.

The general condition of bobcats was determined to be 3.26 for the young of the year and 2.94 for yearlings and older age classes (Greer and Palmisciano, 1979). The average condition showed considerable fat and can be termed "good."

A study area has been selected for intensive study of bobcat ecology in Missoula and Granite counties. The principal investigator moved to the area at the end of the current report period. Most of the necessary field equipment and facilities have been acquired and field work is expected to begin in December 1979.

A masters degree stipend study has been initiated on the status and distribution of the river otter in the Missouri headwaters river system. A student has been selected and field investigations will begin in November 1979.

RECOMMENDATIONS:

Studies of these species were just initiated during the final months of this report period. The intensive bobcat study should be continued for the next five years. The on-going otter study should be continued and several other similar studies should be conducted to obtain population status and distribution in northwestern Montana and in an area of unexploited populations for comparative data.

The date for submittal of the job progress report should be permanently changed from 1 July to 1 October in order to allow adequate time to prepare the biological specimens from the carcass collections. Analysis cannot be initiated until the April 30 closure of trapping seasons and all carcasses have been received. The analysis of specimens are inherently time consuming and much of the aging procedures are accomplished by outside facilities that are frequently unable to meet rigid schedules. A two-month period is totally too inadequate to prepare specimen collections, conduct the analyses and prepare the report.

This program should be expanded to include the acquisition of approximately 50 percent of all harvested bobcat carcasses and 100 percent of the harvested lynx, river otter, and wolverine carcasses on a continuing basis for five years. This can be achieved by purchasing the carcasses from trapper licensees or implementing regulations that require the submission of all carcasses. This would insure an adequate sample size to obtain valid baseline biological information on the sex and age structure, reproductive status and history, food habits, general condition and disease and parasite loads of the harvested segments of various populations by species.

Table 2. Incidence of food items found in stomach and/or descending colon of bobcat carcasses from the 1978-79 harvest.

| Items | Region / Sample | 1 / 33 | 2 / 5 | 3 / 31 | 4 / 11 | 5 / 2 | 7 / 7 | Total / 89 |
|---|---|---|---|---|---|---|---|---|
| Red Squirrel | | 18 | 1 | 1 | 1 | | | 21 |
| Deer (Mule, WT) | | 7 | | 4 | 3 | | | 14 |
| Cervidae - unid. | | | | 1 | | | | 1 |
| Cottontail | | (4)[1] | | (13) | (6) | | (5) | (28) |
| Snowshoe Hare | | (2) | | | | | | (2) |
| Jack rabbit | | | | | | | (1) | (1) |
| Lagomorphs-unid. | | (2) | | (12) | (1) | (2) | | (17) |
| Lagomorpha[2]- Total | | 8 | | 25 | 7 | 2 | 6 | 48 |
| Porcupine | | | 2 | | 1 | | | 3 |
| Muskrat | | | | 1 | | | | 1 |
| Microtus | | 2 | 2 | 2 | 2 | | 3 | 11 |
| Peromyscus | | | 1 | | 1 | | | 2 |
| Pocket gopher | | | | | 1 | | | 1 |
| Ground squirrel | | 1 | | | | | | 1 |
| Grouse - unid. | | 1 | | | | | | 1 |
| Bird - unid. | | | | 2 | 1 | | | 3 |
| Domestic chicken | | 2 | 1 | | | | | 3 |
| Domestic cow | | 1 | | | | | | 1 |

[1]Identifiable Lagomorphs
[2]Pikas, rabbits and hares

LITERATURE CITED

Greer, K. R. and D. Palmisciano. 1979. Wildlife Laboratory, Mont. Dept. of Fish, Wildlife and Parks, Prog. Rept., Proj. W-120-R-10, L-1.1. 14pp.


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| State | Montana | Title | Statewide Wildlife Research |
| Project No. | W-120-R-10(5894) | Title | Nongame Animal Research |
| Program No. | III | Title | Nongame Animal Research |
| Study No. | NG-49.1 | Title | Habitat characteristics of bobcat, Canada lynx and river otter. |
| Job No. | 2 | | |

Period Covered: July 1, 1979 - June 30, 1980

Prepared by: Howard S. Hash

Howard S. Hash

Approved by: John D. Cada

John P. Weigand

Date: September 10, 1980

ABSTRACT:

Montana maps that depict habitats and distribution of bobcat, Canada lynx and river otter are being developed. Harvest data from these species are being incorporated on a continuing basis.

Biological specimens were obtained and analyzed from 191 bobcats, 5 lynx and 7 otter todetermine sex and age structure, food habits, reproductive status and history, general condition, and disease and parasite loads.

A long-term, intensive bobcat ecology study is underway in Missoula, Granite and Powell counties to investigate the general ecology and biology of bobcat populations in a coniferous forest environment.

A river otter population status and distribution study in southwestern Montana is in progress.

OBJECTIVE:

To conduct studies providing information on the habitat of bobcat, Canada lynx and river otter and transform these data into improved management guidelines for these species.

PROCEDURES:

Montana base maps and overlays are being used to designate general habitat and geographic distribution of the harvested and observed increments of the bobcat, Canada lynx and river otter populations.

Department personnel are being consulted regarding the location and general quality of bobcat habitat within their respective areas. Aerial reconnaissance, aerial photos and landsat imagery will be used to derive detail for the base maps. Harvest records are being related to various habitat types, human habitation and land use patterns.

Biological samples from bobcats, Canada lynx and river otter were processed in the Department wildlife lab (Greer and Palmisciano, 1980) using the degree of foramen closure as criteria for differentiating the young of the year from the older age classes. Cementum annuli were designated by a commercial lab on the older specimens.

Stomach and/or colon contents were analyzed (Greer and Palmisciano, 1980) using known reference material to qualitatively and quantitatively designate food items and the presence of parasites and disease.

The general condition of carcasses was determined using a descending classification ranking system of 1-5 that considered body, omentum and kidney fat indices (Greer and Palmisciano, 1980).

Reproductive tracts were prepared for analysis to determine reproductive status and history (Greer and Palmisciano, 1980).

A long-term, intensive study of bobcat ecology in a coniferous forest habitat is in progress. Telemetry is being used to gather relocation data from sample animals of known age, sex and origin. Migrations, dispersal, range use, habitat selection, response to hunting and/or trapping pressure, response to variation in weather and other movements data is being compiled.

Habitat and range use will be delineated on maps and overlays of the area in reference to known cover types and habitat types that are present.

Food habits data will be compiled from the analysis of digestive tracts of harvested animals and the analysis of scats collected within the study area. These data will be related to prey species availability as determined by sample trapping within specific habitat types.

Data regarding long-term population structure and dynamics will be compiled utilizing reproductive tracts and jaws from harvested animals to designate sex, age classes, reproductive history and success. Kitten survival will be investigated using radio telemetry and direct observations.

Relationships of bobcats to prey and other predatory species will be investigated.

Visual observation of otters and otter sign are the primary technique being employed to assess otter populations and to compare relative otter densities on the rivers of the upper Missouri group. Boat and foot travel and aerial reconnaissance are the primary techniques that are being utilized.

The physical characteristics of occupied otter habitat are being recorded. These data will be used to compare occupied areas with the existing spectrum of habitats to denote habitat selection or preference. Digestive tracts from harvested otter and scats will be collected and analyzed to determine food items. These data will be related to the existing food base within occupied habitats.

The possibility of inducing otter to use or visit artificially created latrine sites is being evaluated as an otter population trend assessment technique.

FINDINGS:

Bobcat Studies

Montana base maps delineating general areas of bobcat habitat have been prepared. The geographic distribution of harvested and observed animals has been plotted for the past two seasons. The plotting procedure for the 1979-80 harvest remains in progress.

The age classes of 191 bobcats, 15 percent of the 1979-80 harvest, are presented in Table 1. Young of the year and age classes 1, 2 and 3 comprised 35, 29, 15 and 11 percent of the sample, respectively. No bobcats 10 or more years old were harvested.

The sex ratio of 1292 registered bobcats harvested during the 1979-80 season was 1.00 males to 0.95 females.

Food habits data from 94 bobcats are presented in Table 2. Rabbits, microtenes, birds, and porcupines comprised 32, 15, 5 and 5 percent of the food items, respectively.

The general condition of harvested bobcat carcasses are presented in Table 3. A mean value of 2.71 on a scale of 1-5 was determined. This index was somewhat above the 3.10 mean value recorded for the previous season.

A general study area was selected for intensive study of bobcat ecology in Missoula, Granite and Powell Counties. The principal investigator moved to the area at the end of the previous reporting period and field operations began in December 1979. Field camp facilities and equipment were obtained and transported to the study area. Trapping operations were initiated by a masters candidate in January 1980. Approximately 500 trap nights produced two bobcat visits and no captures January and February from the Rock Creek drainage. Trapping efforts by the master's candidate in the Rock Creek drainage were terminated about mid-March.

An additional trapping effort of approximately 1000 trap nights by the principal investigator in several drainages north of the Clark Fork River during late March and early April produced three bobcat visits and the capture of one female bobcat. The captured bobcat was immobilized and fitted with a radio collar and released at the capture site. This animal has been regularly monitored and data on range, movements and habitat selection are being obtained. The results are inconclusive and analysis will be initiated when adequate data from this and other animals has been acquired.

The trapping success ratio appears to have been directly related to the unusually mild winter with a general lack of snow accumulation, an abundance of snowshoe hare, cottontail rabbits and pine squirrels, and heavy commercial trapping pressure.

Sixteen bobcat tracks were encountered while traveling over 2,550 transect kilometers of trails and/or roads during good tracking conditions as part of the total field effort.

Otter Studies

A masters candicate began field operations on the status and distribution of the river otter in the Missouri headwaters river system in November 1979. Data are being successfully gathered upon the population status, habitat utilization and a supplemental progress report is pending.

RECOMMENDATIONS:

Field studies of these species were commenced during November and December, 1980 and should be fully operative during the 1980-81 reporting period.

The intensive bobcat study should be continued for a minimum of 5 years. Similar studies are needed in other major habitats especially in eastern Montana.

The on-going otter study should be continued and other similar studies should be conducted to obtain population status and distribution in other regions in Montana and within an area of unexploited populations in order to obtain comparative data.

The carcass study should be expanded to include all harvested bobcat, lynx, and otter carcasses on a continuous basis for a 3 year period. Mandatory transmittal of all harvested bobcat, lynx and otter carcasses to the Department of Fish, Wildlife and Parks is recommended. This would ensure an adequate sample to obtain valid baseline information on the sex and age structure, reproductive status and history, food habits, general condition and disease and parasite loads of the harvested segments of various populations by species.

Table 1. Bobcat ages in years, 1979-80 harvest, as determined by cementum layers of upper canines.

| REGION | ½ | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 8 | 3 | 2 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 17 |
| 2 | 9 | 3 | 5 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 21 |
| 3 | 16 | 16 | 6 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 42 |
| 4 | 5 | 4 | 0 | 7 | 0 | 0 | 1 | 0 | 0 | 0 | 17 |
| 5 | 10 | 9 | 3 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 26 |
| 6 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 4 |
| 7 | 14 | 16 | 7 | 0 | 3 | 0 | 3 | 0 | 0 | 1 | 44 |
| Unknown | 5 | 5 | 4 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 20 |
| State Total | 67 | 56 | 28 | 21 | 4 | 3 | 6 | 1 | 1 | 4 | 191 |
| Percentages | 35 | 29 | 15 | 11 | 2 | 2 | 3 | Tr. | Tr. | 2 | 99 |

Table 2. Incidence of food items found in stomach and/or descending colon of bobcat carcasses from the 1979-80 harvest.

| Items | Region / Sample | 1<br>15 | 2<br>16 | 3<br>31 | 4<br>9 | 5<br>9 | 7<br>10 | Unk.Loc.<br>4 | Total<br>94 |
|---|---|---|---|---|---|---|---|---|---|
| **Mammals** | | | | | | | | | |
| **Cerridaes:** | | | | | | | | | |
| Deer (Mule, WT) 1/ Elk | | | 1 | 3 | | | | | 4 |
| Unidentified | | 1 | | | | | | | 1 |
| **Lagomorpha:** | | | | | | | | | |
| Cottontail | | | | 3 | | | 1 | 1 | 5 |
| Snowshoe Hare | | | | | | | | | |
| Domestic rabbit | | | | | 1 | | | | 1 |
| Unidentified | | 3 | 6 | 10 | 3 | 1 | 2 | | 25 |
| Total | | 3 | 6 | 13 | 4 | 1 | 3 | 1 | 31 |
| **Others:** | | | | | | | | | |
| Porcupine | | | 1 | 2 | | 2 | | | 5 |
| Muskrat | | 1 | 1 | | | | | | 2 |
| Microtus sp. | | 2 | 4 | 4 | 1 | 1 | 3 | 1 | 16 |
| Peromyscus sp. | | | | 2 | 1 | | | | 3 |
| Pocket gopher | | | 1 | | | | | | 1 |
| Red Squirrel | | 1 | 2 | | | | | 2 | 5 |
| Ground squirrel | | | 1 | | | | | | 1 |
| Flying Squirrel | | | 2 | | | | | | 2 |
| Wood rat (*Neatoma cineria*) | | | | | 1 | | | | 1 |
| Prairie dog (*Cynomys ludovicianus*) | | | | | 1 | | | | 1 |
| Raccoon (Procyon lotor) | | | | | | | 1 | | 1 |
| **Birds:** | | | | | | | | | |
| Grouse - unid. | | 1 | | | | | | | 1 |
| Bird - unid. | | | 1 | | 3 | | | 1 | 5 |

1/ Odocoileus hemionus and O. virginianus

Table 3. Bobcat fat index ratings from carcasses obtained from the 1979-80 harvest.

| Region | No. Individuals Condition Rating[1] 1 | 2 | 3 | 4 | 5 | Total |
|---|---|---|---|---|---|---|
| 1 | 3 | 3 | 1 | 1 | 4 | 12 |
| 2 | 4 | 7 | 3 | 4 | 0 | 18 |
| 3 | 7 | 11 | 7 | 6 | 2 | 33 |
| 4 | 5 | 1 | 1 | 2 | 1 | 10 |
| 5 | 3 | 5 | 0 | 1 | 0 | 9 |
| 7 | 1 | 2 | 1 | 3 | 4 | 11 |
| Unknown | 0 | 2 | 2 | 0 | 0 | 4 |
| Total | 23 | 31 | 15 | 17 | 11 | 97 |
| % of Class; Statewide | 24 | 32 | 15 | 18 | 11 | 100 |

Mean rating 2.71

[1] 1-5 ratings with 1 as highest index and 5 as the lowest.